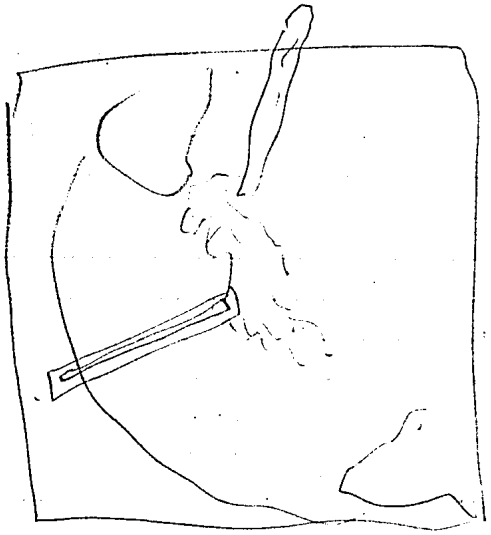
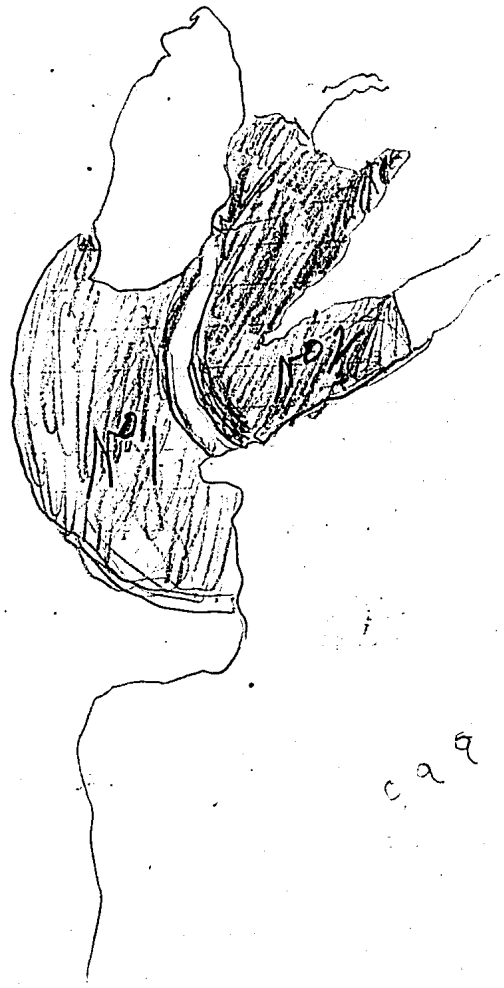
Notebook Series -- Notebooks by Edison
Notebook, N-16-01-01

This notebook was used by Edison, probably during the period November 1917-January 1918, to record information taken from naval intelligence reports. Scattered throughout the book are numerous entries with dates ranging from 1915 through 1918, but the dates appear to refer to the date of the event described or the intelligence report consulted, rather than the day on which the information was entered into the notebook. Included are accounts and observations pertaining to wartime shipping and naval operations, along with occasional suggestions for strategic or technological improvements. There are numerous references to submarine warfare and to the equipment of submarines, both German and Allied. Also included are notes on torpedo detection, naval communications, ordinance, storage batteries, and the use of airplanes, zeppelins, and balloons. Specific battles and naval engagements are frequently mentioned. The cover is marked "War" and "4." The pages are unnumbered. Approximately 160 pages have been used.

1260

1260 4 50





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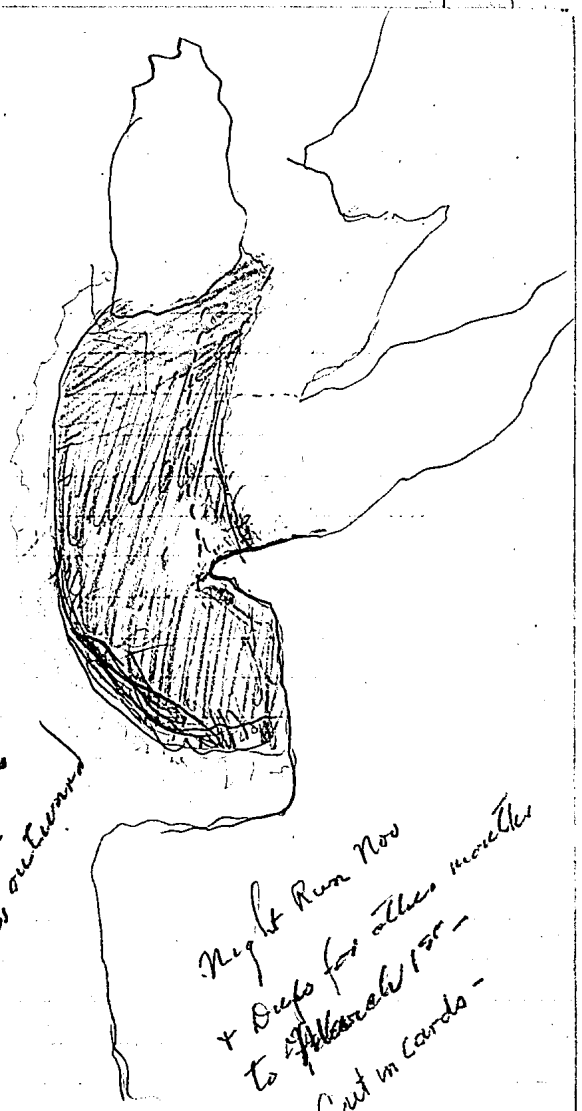
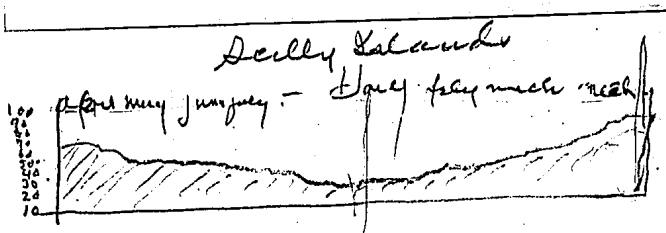


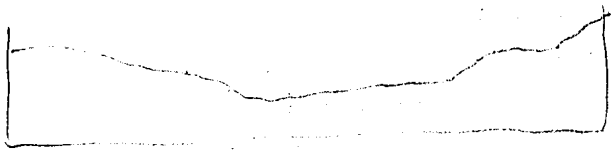
Based on
11 Knots
now –
9 Knots outward

Night Run Now
+ Days for other months
to [illegible] –
Cut in cards –

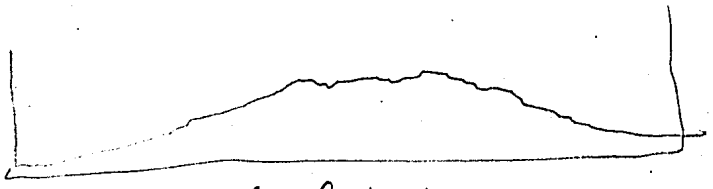
Scilly Islands



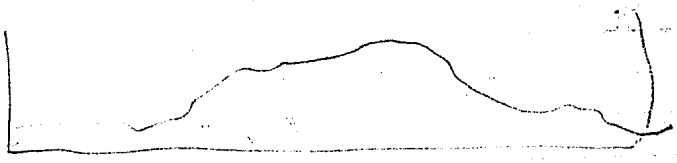
Amount of sunshine days



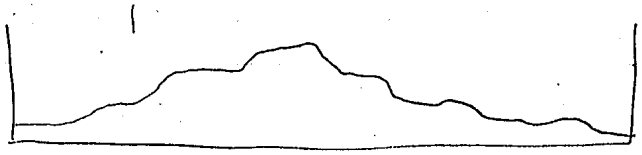
Rainy days.



amount of darkness absolutely



amount of twilight + darkness



If Volume of shipping is the same also the number of submarines the same, The above Curve shows the number of vessels which will be sunk in Nov Dec 1917 + Jan Feby March April May June + July 1918

1260

36

1205 miles

April 21 55
28 48
Mchy 5 46

Mch 56
April 177 Oct 96
Nov 55
May 191
June 148
July 165
Aug 169
Sept 95

Jany	1	7.1		
	2	5.4		
	3	6.4		
	4	21.0		
Feby	1	10.5		
	2	19.6		
	3	20.3		
	4	8.3		
	½	3.8		
March	½	8.3	22	14
	1	8.5	17	13
	2	5.1	24	16
	3	10.7	25	18
	4	24.2	31	18
		56.8		79
April	1	50.	19	17
	2	43.2	28	19
	3	14	55	40
	4	57.6	48	35
		164		111
May	1	19	48	24
	2	13.1	23	18
	3	62.7	27	18
	4	59	19	18
	½	38.2	18	15
		192		93

Sum

56	79
164	111
192	93
56	100
135	52
167	65
95	64

June	1/2	17.3	18	15
	1	44.8	32	22
	2	33.2	32	27
	3	27.4	28	21
	4	30.7	20	15
		156.9		100
July	1	30.4	20	15
	2	21.9	17	14
	3	37.4	18	14
	4	45.3	24	21
			21	18
		135.2		82
Aug		167.1		21
				14
				15
				18
				68
Sept		98—		20
				12
				8
				13
				11
				64

29 — 1
60 — 1
~~50 — 1~~
~~43 — 1~~
47-48 4
38-40 4
33-35-36-37- 8
43-44- 3
50-52-53- 5

~~29 1~~
~~53 11~~
~~60 1~~
~~36 11~~
~~44 1~~
~~20 11~~
~~38 1~~
~~40 1~~
~~48 1~~

50-1
~~35 1~~
43-
~~35~~
~~40~~
52
~~35~~
~~35~~
~~34~~
~~35~~
47
47
~~47~~
~~40~~
~~37~~

~~47-45 4~~
38-40- 4
33 1
35-36-37. 8
44- 1
43 1
50.52-53 4

Intelligence -

Composition of Mexican dummy to make smoke when TNT sharpnel explodes - (Russian shell) TNT in separate brass cases & then placed in shell -

Italian 18 Sub M to keep at sea
Commander says very difficult to hand on personnel -
Can submerge from surface running in 4 minutes - 30 sec

English (American made) Sub M
Periscope pull down -

Dane subs have collapsible boats lashed to side of conning tower
~~[illegible]~~

Italian Cruiser going 18 knots
2 Torpedoes fired 1 missed
other struck. Capsized in 20
min – just after daylight was
attacked –

German Sub in Adriatic used as
bait to fool Destroyer which tried
ram him after trick scow thrown
Torpedoed in bow Destroyer
sunk – trying ram down sub

English has Merchant Vessels
which appear in Dalhousie to
be War ships

Italian Cruising ships have a
fake bow wave painted to
give submarine idea of going
great speed
English did it & then stopped it

English drag line with Travelers
bombs on line electrically
Exploded – when line caught
that particular part with bomb
Exploded –

~~Ital~~ Cant lay mines in Brindisi
Channel too deep & tide too
strong ? so stated by Spaniard

Chg on tap Diesel Engine to leeward
Could be heard for miles on
Calm night – Destroyer Drifts
along then suddenly throws
arc light on & fires –

French have 65
Converted boats patrolling
Channel Theer 1/– from La Hague
~~Channel~~ they divide area in squares
Each drifts around in their square
speed 9 @ 11 Knots for months only head

Opportunity offering at Subs
5 times - boats too
close -

3 English War ships
sunk at Dardanelles by
Turk sub - because
English boats had
unscreened lights - not
screened because surrounded
by destroyers -

Falkland battery. Germans
made wonderful shots
at 10 & 12000 yds
Salvos accurate

English subs try to get between
Enemy & the shore

A destroyer (German) didn't see
an English periscope 6 inches
above water when within
100 @ 140 ft - German didn't see
periscope.

English have cons
& fans with oil - gives immense
black smoke column 40
ft high - have 6 boats
thus fitted for use on
Dardanelles

May 25 1915

Foreign boats which formerly
painted our war color
now painted light grey

May 15 1915

Masts shortened on all large Italian warships

all top masts struck below

large radio mast needed in Adriatic – visibility of ships decreased by cutting down masts –

In England

Tetra nitro-Aniline used to some extent as primer or booster for explosive charge for propelled torpedoes El

not used to great extent because rather dangerous & may not stand shock of explosion or heat.

Tetra-Nitro-Methylaniline is used for same purposes to a much greater extent

Speaks of a German torpedo which goes certain distance, turns around & comes back. Has an attachment that gives a chance of hitting – done with guns

Germans at Falkland Islands always fired after English as their smoke interfered with English spotters, 12 @ 16000 yds

the coal was from Iqui

Why not Chicago near by but not enough to prevent shooting doing it by dumpling system

Says at these distance Range finders very little use & range finding challenges impossible on account of great range & difficulty of observing

OOd

Firm was conducted from fore top during entire battle.
Ship steaming down wind most of time — Smoke from funnels & Conduits interfered with range finding

2 officers necessary aloft one at forward end & on at after end top as splashes from Enemy's shot frequently shut off view of one or the other but rarely both.

large quantity water thrown over ships by Enemy's shot & Control at top frequently wetted, Command keeping off all glasses necessary also hurted sights.

Bow Wash was point of aim but not good one as it was hardly visible

Enemy altered his Course 16 points several times & premitted our some occasions necessary stern for bow. Careening & Expansion at no time was center part of Enemy's ships more obscured than bow or stern.

Director system not used but it would have been of unequal Value as smoke at times seriously interfered with laying of guns of two turrets.

Voice tubes to top wrecked, flex voice tubes expanded on deck near Conning tower entirely wrecked by blast of 8.2 shell like 2" copper tubes in same place not wrecked

Telefone to top Control direct to Each turret officer OK & was invaluable

Spotting against one Enemy ship difficult she Zig Zaged

Changes of course could not be detected & continual sounding was necessary

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French Cruiser Jean Bart torpedoed at midnight, but she stopped to examine papers of a 3 masted vessel

Radio out by

(Why not some sound app + battery on top mast? ed)

April 15 1915

A German Sub Officer reported to have said

1° greatest danger to be avoided is being rammed.

When periscope 1st emerges danger is greatest as sub can be rammed before enemy is seen

(Why? Water falling perhaps ed)

Subs Cant attack British Transports in ~~Channel or~~ straits as they are absolutely enveloped by destroyers

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Russians use 2 balloons for fire control of Warships

In landing aeroplanes at night, ~~[illegible]~~ ~~day~~ impossible to see down more than 50 ft - landing place powered with gasolene + lighted, but this proved dangerous but now 6 CP Electric + Dry Cells used weighing 4 lbs -

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German Subs - periscopes painted grey Recognition marks on top of periscope such as a Seagull

Apl 25 1915

German
says easy to hit vessel on a straight course, extremely difficult when speed & course changes — Same informant says when sub on bottom men cant sleep on account of the swell —

March 1 1915 speaks of use of big depth bombs for submarines

Nearly all torpedo hits from submarines been made when vessel less than 10 knots & at less range than 1000 yards

E.g. [redacted] was only 200 yards from S 126 when torpedo which sunk the latter was fired no marked concussion or other effect of explosion was noticed in the Sub'M & the

pressure indicator didnt even flicker. U 9 reports similar data from torpedos fired at 500 yards

Formidable torpedoed 2 AM — Full moon —

English at Heligoland fired many torpedos from subs without a single hit. The Germans were cruising at high speed —

Says French subs no good as they carry their torpedos aft side & cant lie on bottom at night as British do — In rough weather subs have to keep under way as waves bump them on the bottom even in 20 fathoms
(Dont believe it Tom)

German Sub. tried attack Magulons off Zuibaggie, but water too shallow & could not get within range

British destroyers rammed German sub at 10 knots & dent sunk sub but bows of destroyers damaged.

Battle off Coronel.

Sea rough, ships rolling & pitching badly so as to interfere seriously with shooting

Germans at Tsing Tao used illuminating shells but not much value as illumination too poor

Density of mines from mouth of Thames & Scheldt 3.2 per sqr mile

Many British Cruisers been fitted with spars 15 ft long secured underneath the bow & projecting downward & outward with idea exploding mines before latter strike hull.

Time to make a German Torpedo 4 months, weight TNT 180 Kilo

March 1915 - Many experiments with aeroplanes carrying torpedoes Range 1000 ft. 14" dia wt 750 lbs but accuracy of forming bad

Utilization of Extensive English Experiments made - Germans also

Moving Picture are taken from aeroplanes - (secret German process)

Krupp has aeroplane bomb which doesnt Explode by impact but when the speed & air pressure reaches a certain amount

Germans drop an aerial Torpedo, 20" long 4" dia TNT in head & percussion impact fuse. Gas has slow burning powder & a turbine, This gives high vel & rotates shell.

End of March 1915 to Oct 1 1915

Russian deep aeroplane bombs weighing 1080 lbs one bomb, Equivalent Carries 2 of these Bombs & 4 men

Big shells from Monitors bury themselves in sand dunes so deep before exploding that they do little damage

Some French ports difficult Entrance sometimes ships piled one on the other from submarine sinking

Germans lay 40 mines in groups. Clockwork only lets up a group, if these are swept away by sweeper another lot pops up soon

1915 –
Trawlers are sent to trail
Microphones astern while
on station looking for
submarines, other vessels
do the same

English Oct 29 15
used oil on sea
Smear periscopes
English have extra glass in
front & then remove it to
get rid scum –
Says dirty water –
harbors are bad

English all water of
sub was last boat
& go ahead drop net
Nov 26 15

English Sub. Mine layers
Carry 12 mines 3 ft 11 1/4 inches
long 21" dia

Italians use X ray to
locate faults in steel,
guns etc – great ease

Relining guns – placed –
Hot Paraffine & interior
sprayed cold liquid &
tube pulled out, new inserted
& then inflated

Wireless telephones used in
Italian fleet. Marconi says
very successful –
Dec 8 1915

Italians say Explosive effect
3" Aeroplane gun must know
direct hit to be of any use
should be larger gun,
say don't think Shrapnel any
good for aeros all favor
high Explosive shells

Search lights no good to
detect aeroplanes at
night,

English trawlers 2 drag a
net so arranged as to spread of
boats & length of net that it
reaches near bottom,
in net is Calcium phosphide
bulbs - When sub caught
boats cross cross &
Tangle up sub & phosphide
bulbs burst & come to top light
up

Jany 7 1916

Periscopes on English subs —
raised & lowered by Motors

English torpedo in Baltic
got within 200 yards Exploded
torpedo & shock dangerously
injured English sub —
up to this date English
had no Frazerken attacks
Canadian boats just
arrived surprised English

English sub running
under & close to a Traveler
Decoy when German
sub appeared Englishman
let go torpedo

German Subs Diesel 400
Revs min

May 5 1916

Fuel tanks used on German subs exclusively
plates 15X18 – 55 plates to
a cell in largest boats
independent tells used & installed always in tanks
idea small units was ease of repair & replacement & less breakage & losses & less due to vibration of boat,

Plante Pas used

Austrian Dropped bombs on Venice – Moonlight, Could hear motors but could see nothing although arc lights going –
Guns minimum at night searchlights only help them

Italian officer suggests only weapon good at 2000 yds is machine gun & if it could be rotated in a circle it would do the thing –

English Subs have broadside tubes
Commander thinks most important 8 tubes 4 in tubes 4 aft – 21"
Stay out 1 week in English Channel
50% of shots are broadside shots
object broadside tubes cover much more area without maneuvering
Commander 60% make hits in practice – but get on close as possible –

English have steam
Private Subs – 1200 HP
2 built 14 K submerged 21 Top

These boats can run 3 hours at 9 Knots submerged

Ventilate with Vent pipes to Loading Compartment.
Sailing Water in Tanks — no distilling aft on board — Boats heated by Elec — Cooking dittto

Periscopes not located in Conning Tower —
Walk around periscopes used
Magnify 1 power

Range finder, just graduation on periscope glass

Conning T armored 3"

Submarine Bell for signaling only Arrow built Subs have essential.

E boats take 8 or 9 minutes to get down

auxiliary lighting Portable Storage batteries Like Hubbell but superior, thank to a lead battery, since ever been using a lot of deep cycling flashlights

They have a gyro repeater so it will reflect thru periscope

Batteries are Chloride 3500 amp at high rate

Dont use individual Voltage leads; but believe in them from running interconnection batts

Use only 1 motor on shaft
Radio masts cannot be
set up from inside of boat

Jany 24 1916

German areas fly in
Column 6@10 miles
distant, wireless 20 KM but
Exchange & repeat messages
& thus reach any
distance

German have a searchlight
Can read newspaper 1000 meters
use storage battery - very
light Reflector + all Carried
on breast of aviator (not battery)
Ray seen 20 K Motor Extra battery carried in pocket
airplane wing.

All gyros on Torpedoes uncertain
Eng Dman, Italian

Ration headers Newspapers
rolled up dipped in formaline
+ burnt 20 minutes made
by Woman all over Italy
used in France Extensively

Jany 1 1916

Italian parliament
Criticism Italian Navy for
inactivity - Harsh words
used

One Case Bombardment of
Durazzo, Italians knew from
Cables it was to take place
yet did not notify Either French
or English, later heard of it
accidentally + started but too
late - French have great
Contempt for Italian Navy
There is no doubt about Class
treats - Navy slang in port lets friends & foreign
friends

Reason Sharpnel no to hit aeroplane is they are only a prolongation of the Trajectory

Jany 22 16, In France plans for subs have been definitely abandoned

English heavy nets -
Dover to French Coast.
Portland Hill to Cape La Hague
Mull of Cantyre to Ireland
Carnsore point Ireland to St Davids Head - S Wales - descend to depth of 300 ft - filled with gates permit passage of vessels

Microphones used near Paris to detect aeroplanes & Zeps

Jany 18/16 - One boat collided with boat loaded ammunition sea Marmora - Exploded terribly

Gyros in Torpedoes are OK for 2 minutes only -

Feby 3/16

Prounuda Dyalan interior w Communist now Employed in French war Ships.
Very satisfactory

7 men on Goeben ~~lost~~ ~~killed by~~ Killed by poisonous gases from TNT although worked to hospital then shortly dead

Aeroplane Light
German -
7 Cells Sammler battery
Osram incandescent short life
50 hours ? weight battery &
housing 4 Kilograms
battery can stand on its head
without loss of electricity
Signal app & cable weight
1 Kilo

French aeroplane drop
a bomb containing
information letter -
on sticking fault inflammable
material ignited showing
attention to volume it was -

Feby 14/16
Curtis turbines in Italian
Vessels not popular -
Turbine Rescue bad
Vibrations when Zig Zagging

Feby 24/16
English use 5 + 6 pounder
guns against Aeros + Zep
Effect pathetic + ludicrous - Mg

Allies have device
to locate radio stations by
turning ship - Caught one
German sub lies in ambush

Feby 14/16
Comdr-in-chief German Navy
retired, (Was a chump)

March 6/16

Falkland Is Battles. English vessels all short of ammunition —

Elec lighting unsatisfactory 1st shell put out all lights due to breakage of Carbon filaments use Hg Vapor lamps now

Dogger Bank action —
18000 to 19000 yards spotted by aeroplane 2400 rounds
60 hits —

over 3000 Trawlers now wkg —

Elec boats built my workshops generally sunk on 6th round open seams —
only 120 ft boats any good

says Germans losses of sub to Jany 1916 — 126 —
doubtful cases not counted
26 British subs got near Heligoland & submerged, German not suspecting Canna sent last sunk, British during same period lost 30 —

The 10 German boats delivered by Vickers from Canada have no proved very unsatisfactory several are at Gibraltar & out of Commn & several others in British ports recommng new boilers

The one successful boat is the Monitors 15" guns one torpedoed but OK room repaired

British navy March 16/16

four Light Cruisers 3500 tons
all steel. 35 @ 40 Knots
+ fairly heavy armor
+ a 120 ft armed patrol
boat beam 17 ft 6 ft draft
20 Knots - 2 of 3" guns +
torpedo launching apparatus

Curtiss + Engine have
proved most unsatisfactory
& now only used for instruction
40 laying in junk

Thomas Machine worse

Explosive tests on an old
ship in Amer Navy
didn't break filaments

Italians filled an old battle ship
with Cork then went to sea

English have surface
cruiser - 1300 ton one or more
3" or 1 6" gun to send she
has Barcelona

Needs Allies propaganda badly
in Spain especially
Barcelona

Aquitania & Mauretania mechanism
not efficient as transports,

Germans have an Aero Muffler
large bolted horn with gentle bend
4% power only lost

Mch 11/16

Anti Rolling Gyroscope furnished by Sperry for new Italian warships

French use little pendulum in front of eyes of aviator with circles so if he gets in Cloud he can keep level -

Denmark Coast English had a Submarine wrecked E 13 due to failure of Sperry gyro to function properly

Loss of Voltage is used to have Curved Error in Compass readings -

April 5 /16

Bat Gannon rocket go up 500 meters

Hungarian inventor offers USA to produce rocket which will go up 2500 & large ones 5000 meters -

English Elevedavis all enlisted men under Army - Navy gets them from army

Italian Navy 24 ft Balloons propelled entirely by Storage Batts

30 Tons displacement

25 miles radius at 5 Knots - Coast defense

4 men 2 torpedoes on deck dropped from slings

also 6 more 40 Tons displ 200 miles Radius Gasoline Eng on deck to chg Balloons

2 18" Reclaimed tubes
sent by railroads -

March/16 - whole West Coast
France heavily mined by
Germans - land by neutral
Norwegian & Danish boats
worked by Germans -
~~[illegible]~~ these boats bring
Cargos to French ports &
when going out drop mines
from bottom of ship -
French are on -

April 14 several gas
Explosions lately in English
subs. due to inadequate
Ventilators & Carburetters
E 30 was charging batteries
& Ventilators were not properly

opened - man pulled on
Charging switch, arc caused
an Explosion Killed 4 men &
seriously injured several
others.

Italians have periscope
raised & lowered while
observing - Chair wheels
around

German Periscopes
$7\frac{1}{2}$ meters - dome panorama
10 meters, telescopic coated by
Weston

Upper part periscope much smaller
than lower so cut down easier
better 70 M - lower 150 M -
latest is they have very smaller part

April 19/16 French introduced
Square nose shells for depth
Exploding against submarines

Illuminating material for
illuminating shells
Perchlorate K Sulfur
Aluminum 6% carbon
what % 1st 2

1917

July 1917
British Sub-K 5
Steam drum 22 Knots
6 Knots submerged 50 min 3 atm
340 ft long 2,200 tons
1700 tons on surface
8 tubes - 18"
Stacks telescope into boat

Hawkes

1917-July Arsenuretted Hydrogen
troubles on submarine
Use mercuric chloride
test paper - makes yellow
spot. Gutzeits test,
paper dry
Drop a drop of 5% sol
of mercuric chloride on
center of piece thin
unsized filter paper
4 cm sq - dry before
using - apply in Enclosure
Dwat or bottom over
space

Arsenuretted Hydrogen
is nearly as bad -
both are regularly given
off as English French day

SbH soon decomposed but
AsH is stable,
Arsenic introduced into
battery by the H_2SO_4 is more
dangerous than arsenic in
the lead = Antimony is always
in the lead

In chg battery arsenicated
Hydrogen is not liberated in
battery Except in very
small amounts almost
all being deposited on
Pos plate, During discharge
the dissolved arsenic on
plates partially
redissolved in solution
but at same time it
gives off a little
arsenicated Hydrogen

The quantity of AsH given off
on discharg is much smaller
than the period of chg

to purify French circulation
air through porous Column
impregnated with
Silver Nitrate 5% sol
PerMang K not so good

British French all
have radio direction
finders, Orient aerials
work within 1 leg (1°)
those stations, not ships
Can locate a vessel
using her own radio

July 1917 - Subs don't like
let Torpedo go until within
600 yds -
The smoke bombs thrown
from attacked Cargo boats
hung 5 ft above water
sub would get into this
smoke base because
of Ships or couldn't fire
torpedoes above reported
by an officer on gun sub of
a Cargo boat (Amen)

March 1917

Dated Dreadnoughts
from Experiment at
Jutland - has 2 chains
with Kites, at bow -
When thrown overboard
Kites spread out + catch
all mines except those at
bow

Has false sheet outsides
6 to 8 ft out 1/2" steel
with Tubes Containing
Compressed air - for
torpedo protection

German subs will
Torpedo close in so guns
Cant be used when ship surprised
or at long range

Means for handling cargo at Swanpool docks rather limited, no Electric trucks or means for rapid handling of Cargo

One reporter didn't believe in zig zagging with slow speed ships -
dusk hours most critical to a well armed ship -

Days Sperry mine (Depth) rig only 50 lbs
English 190 @ 220 TNT better -
The Draw bar, Spring

Trigger Striker Mechanism float of Sperry mine - Complicated + Expensive, Can be descarded -

3 12 Knot Iroquois Gellar than 30 Knot Lockaper for Subs - with Master depth Counter -

German subs able operate even in very rough seas ship has no advantage

Life boats used as decoys for Skimmers

Lights at night put on 5 seconds every ~~3~~ 5 minutes closer to Zone of 3 min further out

This is signal enough for a Raider to close, & even a Sub near our track to get close enough to fire at ships - Master was frequently warned after says:

Phones always pulling out order -

Phones full salt, loose & broken connections, Cords not weatherproof & no spare parts.

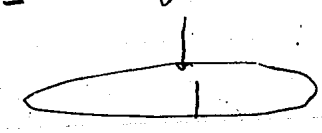
All this on a merchant ship -

Azores full programme

Steamship Virginia - May 3/17

Saw wake of torpedo - Turned 90 & evaded torpedo 15 min after a Sub appeared astern 3 miles away & opened fire, Escaped after both fired shots all missed by superior speed -

Its not believed Subs can operate ~~on~~ off Mexico on account of high water temp 82 in June & aug 90 -



Race

periscope lines to give impression of sub going in another direction

July 1917

Vessel attacked 8 pm by sub with gun fire but visibility diminished & Vessel Escaped

So far 8 Cases torpedo Explosion throughout sub –

German sub prisoners Captured report 2 screws, submerged speed 15 K – surface 21 K

Most of U-6 crew done on surface in rough sea Top Conning Tower hatch closed automatically & is kept open while Cruising all other Hatches being closed U 60 appeared

to Cruise in a well defined destroyed & to Cruise about the sides of a square always in sight of land Every day sights were taken at 8 pm – by ships clock. Wireless received & messages sent.

Cruising on top very rough & uncomfortable but very steady when submerged at one time U-60 submerged 2 nights & 1 day on account inclement weather – for 3 days prior to arriving at Heligoland U 60 Cruised on surface & sighted no vessels a Zig Zag Course was taken & Comdr seemed to have no guide of any kind by which he could direct his course

through mine fields.
Saw 200 subs at Heligoland
All this occurred before March – this report is dated July by Naval officer

Aug 1 1917 Comparing data
French Expts on one of their subs submerged
22 K gun Cotton depth bomb – 10 meters submerged
bombs 10 meters depth
6 meters from Hull –
branch was affected –
then various distances
~~at~~ beyond 14 meters

sub could navigate.
13 to 10 meters sub had to come to surface slight leaks & broken rivets, & damage to interior app
at 7½ meters had a bad leak from broken rivets & open joints.
Old sub & thickness 8 mm much less than modern subs

English Howitzer for bombs for subs –
7½ inch Howitzer
Chgz 1¼ lbs MDT – 15
Cordite 13.
projectile 100 lbs
burster 43 lbs 390 ft seconds
1420 yards also have
11" Howitzer burster 119 lbs

High angle fall to stop
ricochets - also reduced
charge -

Rubaloon used in
trench gas bombs
Chlorine
Phosgene
Hydrocyanic acid
Chloropicrin
Arsenious Chloride
Chloroform
+ Mixes of these

Lachrymatory Shells
Ethyl Iodoacetate,
" " 75% Alcol 25%

1/10 free space

Trench Illuminations

Very pistol Elevation 60°
reach height 100 yrds
before ignited - filled with
mix of Aluminum 20 parts
Barium Nitrate 64 pts
sulphur 16 pts Compressed
into an aluminum tube
the fine meal powder being
added direct on the ends
ignited both ends must
not leave behind a trail
of light 1" Calibre
Have also parachutes

Use also flares in trench
so aeroplane can see them -
Evening Cant used for
signalling
British use 10 million a
month small cylinders 1½ tall
Easy broken open & ignited by taper or
ignition cap

Red Strontium nitrate 70
$KClO_3$ 10
shellac 15
Calomel 2½
sulphur 2½

Green $Ba(ClO_3)_2$ 25
$Ba(NO_3)_2$ 55
shellac 20

White BaO_2 5
$KClO_3$ 17
Al 30
$Ba(NO_3)_2$ 55
shellac 20

Yellow fuse at night —
$NaNO_3$ 70
shellac 30

all used day or night
When used days no smoke should come off

Colored Smoke —
Employ certain kind of dyes in smoke —

Red — Oil yellow 14
Lactose 10 pts
$KClO_3$ 11

Yellow Auramine 14
Lactose 8
$KClO_3$ 11

Blue — Conc methylene blue which contains 20% Dextrin is only one that works satisfactorily
20% of this — 9 lactose + 15 $KClO_3$

Purple — purple dye 50
Lactose 20
$KClO_3$ 30

These are used in 3" mortar shells

Smoke Barrages

Says phosphorous is unquestionably best substance for this purpose

Red –

Tin Can 5" x 3" mix of red phos lumps 70 pts 1/2" mesh.
11 pts red phos powder
fired by NaS detonator or time fuse

Cheaper:

Pitch	30
$NaNO_3$	15
KNO_3	30
S	12
Borax	9
glue	4

Pitch free of volatile oils heated then 350°C
put up in 2 1/2 lb water proof Cans

With strong Container

Pitch 26
Tallow 9 melted + 34

~~[illegible]~~

$NaNO_3$, 14 1/2 Coal dust 14 1/2 Sulfur 2
Stirred in –
Poured in Container gives excellent results —

Convoys from America don't work sometimes –

British have order for all Cargo boats Zig Zag night & day in Zone which varies the speed while N of 30N & E of 20W & in Mediterranean

At night one Cargo boat
fired at at dusk
missed, torpedo
afterwards found light got
out from a port cover
swinging in & out
on its hinges ~~[illegible]~~
Sub a chance –

One Cargo boat armed
Amen – Exide battery
no hydrophone & any apparatus
& telefunken rather.

Spotters are all in Crows nest
some wants nest higher

One Cargo boat Capt
got in fog & started
blowing fog whistle
ship was making 18 K
(Amen boat)

25 men Amen short leaves
Liverpool 4 gun supplied
Complains vessel short handed
perhaps premature –

French Convoy Amen
Transports 16 knots slowing
them down to 12 ½ K
Convoy French boats being on 12 ½ K

The Germans will probably have
in Spring large Cruising
Submarines – no torpedo
tubes but with 2 15 cm
7.1 inches – Very high speed
Extended radius action
Very limited speed submerged
Overheard by Norway prisoner
on German Sub – May 1917

Subs keep in the glare of the sun – 6 10 am –

Top of subs (gun) painted light gray –

Torpedo struck boat but dont explode on striking port door examined bottom & found no damage

2 torpedos fired in Mediterr
On dark night one failed explode passed under the other missed.

Got wrong book –
Now return to 1916 book

October reports

Apl 19 1916 –
Torpedo boats in search of subs steam in Column 1 & @ 20 boats on lighting sub periscope one leaves, dont go direct as Germans throw out a dummy periscope with bomb attached this caused loss of many ships – but go way ahead then drop depth bombs 20 kilos weight, drop several, they explode at 8 meters –
note reports in 1917 show bombs

One reporter says German U boats change their numbers from time to time -
(We just as I thought French & Eng fell for this change as Lusitania May 1917 -

& the above report was dated 7 1916

May 25 1916

Commander of British flotilla at Venice informed Admiralty he knew of no device for detecting Hydrogen in Subs & believed Had British had no such devices said accumulation of gas was primarily the fault of the personnel, from not properly ventilating but stated accumulation of H was one of the serious conditions

which still arose on their service, & one at present unsolved he said several months ago a great rumbling & serious explosion from H

Germans say a surprising large number of English Navy shells fail to explode - ditto overhead guns & great drop given large dispersion - since 2/16

British Commander long experience with Subs at Venice say large subs have no difficulty riding out severe storms at sea at Heligoland Bight impossible to rest on bottom. at depth 60 ft or more as severe motion during heavy weather caused up & down motion -

Italian torpedoes range not over 1500 yds but have high speed 95 Kilo TNT – large torpedoes 6000 yds 115 Kilo –

Torpedoes

Must be taken ashore + broken down every 45 days. (1e) Those made at Whitehead factory at Fiume – reason is that vibration about vessels Easily derranges delicate calculations machinery of Torpedo –

French use small fishing Sailing Vessels 1 sail & steel nets like fishing nets, Cover great area + already caught 2 subs –

French have a small Caterpillar Motor ~~with~~ small brick 2 ft wide 4 ft long – 3 systems of wheels linked up to Caterpillar system of propulsion on either side of the platform raised up 18" from ground there is a Caterpillar system of traction in front of the platform projecting out from the middle there is also connected up to a 3rd system of small wheels also with the Caterpillar method of traction, On top of platform there is a 1/2 HP Electric motor + in rear of that a reel of 200 meters of Electric Cable, Gears are actuated by motor + all 3 of the Caterpillars actuated same time. Machine will march straight ahead if right Caterpillar + one in front is actuated Machine will go to right + similarly to left. ~~of~~ Motor + Caterpillars Enclosed in armor forward is a projection slightly inclined from Vertical towards front of machine

to an iron post 2 ft high 1½ inch
dia on which is fitted the
ordinary type of aerial torpedo but
has 200 lbs Melinite –
This torpedo can be fired or projected
from machine by means of an
Electric Current firing primer
of the propelling charge in base
of torpedo –
They put the machine on side
of trench then men in trench
direct it across No-man's Land
upon arriving at barbed wire
Entanglements Machine is
stopped, Control made torpedo
fired – Machine then brought
back or reloaded
Primary use for attacking
Machine gun Emplacements
Reputed to have great success
on the Somme, he saw it fired

200 of these machines & knew
that at least that number
was sent to France
Can travel over worst shell
hole ground could climb 45°
Its been kept very secret
July 13 1916 –

Italians have a multiple shell
1st explosion throws out (32 CM shell)
560 subshells with effective radius
of 300 metres or 600 metres dia
using common powder ~~Ito~~
The subshells are timed,
14 CM shell radius 100 metres
been tried & worked OK

German Subs Ventilation 28 July / 16
Captured, bat compartment
Ventilated by supply & Exhaust
Exhaust Outlets multiple in
Close relation to underwater bottom
to collect & drain of H_2SO_4
to run rigorously while on surface
~~pos~~ Multiple outlets for exhaust
Ventilation not used on English
Subs in bat compartment
dependence placed on a single
or a double outlet drawing purifying
not employed –
German Sub has very complete
air purifying app by Chemical
means & for O_2 removal from
Cylinders Use cylinder
NaOH – Shelves & trays change area

use O_2 cylinders
No Hydrogen detection –

One British Sub was 36
hours submerged & men OK

German use pneumatic bomb
Wrocwen 8" x 30" cylinders 3000
lbs pressure for air – propelled by
Mortar, Very serious funnel
shots 300 meters fall within 3 meters
No noise or smoke

Torpedoes German use long
pipes & pump air men wear
masks –

French use microphones new
devices & trailed astern
like a patent log. better than
outside of ship –
When ships clapped they hear
Subs 10 Kilometers
British discard long micro &
get in special sea
Blind men employed to listen
as they are 25% better,

Its said Every German ship has a fog producer in which it Can screen itself.

The Mayer Auto gun
many barrels different angles
Covers big area around
Takes, 800 per min -
French & English have
20mm reconnoitered formerly at
depression of
1000 yds 300 square meters

US pat Aug 1915

Its dispersion Effect would largely Counteract unsteady gun platforms -

Its said 10 German Subs built per month 5 on average
Aug 21/16

Germans are using Collerd Electric dust & smoke devices on their ships to stop smoke

German High sea fleet drill & fire at night with powerful search lights at buoys -
moving full speed

Firth Co of England have a fuze which nothing against the Cannon of a dirigible will explode it - (probably friction moves a thing sideways - Tel)

Italians made a special arrangement to get drawings English that so highly of it that sent it by special messenger under a guarantee

French air Bombs have an End only 2" long

Work of scientific men

Sir Jos Thomson stated
the Francis scheme for detecting
Subs will not work

a microphone device will however
detect a sub several miles
but its efficiency is greatly affected
by Temp of water

Sept 28/16

Gustave Zede French sub
Boat moored alongside Quay
wall at Cherbourg. Recharging
Battery, Hydrogen gas given
off Caused Explosion nearly
Completely wrecked interior of Boat
As it was night only 4 men on
board the others in barrack
the 4 men were Killed
Estimated 6 months to repair

French Pay out harbour in
Squares & another a ship here
& Hydroaeroplane search for
Mines & Clears them up perfectly
Section after Section while scanning
others Carried to Round by Enemy
Mines are 23 ft down but
in 300 to 200 ft of water

Flak gun is a machine gun
3500 Meter range has bullets
fixed ammunition 6" long
in belts like a machine gun
5 gun Accord

"Flieger Abschuss Kanone" is
name German gun for Shooting
Aeroplane - height range 2500
Meters

German warships bottom of hull
painted darkest 2nd part lighter
upper works still lighter & spars very
light. They say lower part of
Hull is seen against water & upper
part seen against sky

Excessive vibrations of submarines seems to be a general Complaint, running on top –

They do have a periscope Rangefinder but experimental as yet,

Nov 2/16 –

10 German destroyers made a raid in English Channel at night & sunk 3 destroyers English (fully used searchlights 7 of)

Germans in 1916/ held Russian line with only 880 men to the mile on front trenches

Large number Explos on smoke bombs made at Toulon Nov 16/16 by French. projectile was phosphorus use guns & Machine on boats nothing further learned bout French thought it important Jutland battle Germans used smoke screens the sound which explosion frightening of English

In order for a sub to torpedo a Cargo boat it is necessary for sub to place herself well ahead of oncoming vessel & in this position it is impossible for sub to see if Cargo boat is armed

So far 12 armed Cargo boats sunk
to 16 unarmed

Aug 15 1917

German smoke apparatus.

Dense white fumes is produced by bringing quicklime in contact with Chloro-Sulfonic acid

Lime is in layers in bottom of a cylindrical tin 1 ft dia & 3 or 4 ft long at upper end is spherical container which lets acid drop on lime; it has handles in to carried about

Tracer bulets - phosphorus inside bullet at end bullet is fuse like match plug which melts by friction on rifling of gun ~~the~~ phos escapes & ignites & burns throughout its flight leaving a special trail of smoke

Germans in many occasion or surface clear fog 8

All English subs off Irish Coast paint their upper work dirty white in order to match the sky background

All men on watch wear white clothes & say gas in suits generally sighted before they see English on account of this point.

(?) — English don't like their guns say mustard would rather have a Lewis gun

in long daylight season
they have to submerge 20
hours out 24
Use Lime for CO_2 in trays

Say no partition boats
ok for 20 hours but the
partition boats last 5 hours
men gasp for breath

Listen at night on radio
never send -

D + E boat batteries
worked once month
batteries nearest blower
intake vacuum most weeks
not filled with seperate cell
Valve Leads

Hydrogen question seems to be
ignored, Officers not impressed
with danger take no precaution
Chg 450 amp Tapering off by
Thumb rule & never getting a
full battery
D3 had a crew last fall
body knocked out by
Anaemic H.

British Subs have large
Bow rudders

Some British 1/2 or multiple
battery & go 3/4 Knot speed
giving great endurance when
submerged on patrol

2 German subs work together
1 Does by other watches

~~August 15 1917~~

1st Sept

British using placard torpedoes. thus guns greater range do not leave so clear a wake

No doubt the Vulcan smoke box well hide a ship, but it goes out a flame, but is to hard it to meet boys throwed overboard NG

One Cargo boat saw a walking stick periscope after a torpedo had been found 600 yds distant it was painted Color of sea & the ~~Scan~~ he never would have seen it if the wake of torpedo hadnt painted it out

Intelligence of —

Up to Nov 1 1917

See End book

Torpedoed unseen	12	11	||||| |||||
Torpedo wake seen no Sub	8		||||
Torpedo wake seen afterwards Sub seen	5	11	
Sub seen, then torpedoed	5	1	
Sub not seen, then recognized, sunk	6	11	
Sunk at night	2		
Saw wake of torpedo turned not sunk		4	11
Sighted sub before sunk	6		

Sept 15/17 —

Convoy 5 Strs — Convoyed by 2 destroyers 2 Trawlers Speed 5 Knots — 1 Boat torpedoed — ~~Later joined another convoy~~

Another Convoy 10 Knots speed 3 destroyers 3 trawlers & armed yacht. Attacked & one str torpedoed next day 2 Strs torpedoed Trawlers went to rescue of Crew & Destroyers went for Subs, 6 aircraft & 6 boats made off as fast as could

This attack was considered exceptionally successful & probably due to fact that German subs instead of attempting to cross large areas of Zone were operating in squadrons along certain lanes of traffic

Cargo boat abandoned after Sub gun fire. Smoke boxes used but useless not enough smoke issued from them —
6" gun arranged gun on Cargo boat,

Even the German Sub Commander said to a Captured Crew
" How could anyone Expect to get a sailing Vessell into English Channel without ~~sinking~~ being sunk
He asked whom the Thomson & Crosby were. American Espionage
Evidently send out sailings —
Said he knew the 2 boats sailed same time

Expts British

Sub. moored to buoy 12½ fathoms
Menu 250 lbs gun Collars 15 ft below surface 51 ft from Centre line of sub or 45½ ft from shell of sub at greatest breadth —
on Starboard beam at Centre of boat.
Fore Hatch closed Conning Tower hatch + Ventilator
Open periscope down —
Bridge uncovered
Port torpedo tube full
Condition as if running on gas Eng
Battery fully Chgd 5 p 9
1213

On Explosion - Whole sub
gave violent lurch about
2 ft in water to port

Didn't sink.

Many things wrecked.

After reaching harbor -
found Every Galley Container
broken up, and all out
of Cells ~~[illegible]~~ giving very
great heat due to oxidization
of neg plates

Sub not making water
but Hull slightly distorted
Motors shifted out of line

Thus Experiment is to see if
Mines 100 ft apart
will put surface running
out out of business

They are going to
lay mines this way

1/2 low pressure for age such it was
Calculated under these
Conditions -

English say most important
Torpedo shoved straight out
at its set depth at once

This feature seems to be so matter
which Concern Naval officers
much Concern They are
Experimenting with device in
depth chamber whereby
blast of air upwards or
downwards assists in
quick establishment of
depth - As yet but little
hope is felt for this device
that it will be successful

on war ships Sub watches
have 6 on the each end of Bridge
1 hour shifts, only observers small
section, - says observers on open cannot
keep properly alert,
Lookout Where a shit provided with
glass for bad weather
4 lookouts on each side of
Ship - & arcs do not extend
much further aft than broad
of the bow, English say this
lookout OK & evolved from
experience & satisfied with it
Upper bridge 80 ft from water

~~deformed bow~~

Higher periscopes on Eng K
Sights 2½ dia at top
mainbody 6½"
Lower Peri is 4" dia at top
its this that is used first

but when enemy closely approached
this is housed & small top peri used
Capt said in his experience he could
always get within 2000 yrds
of his own battleships <u>without</u>
<u>detection</u>.

English have battleship
torpedoes 18000 yrds at
15 knots,

German Subs transmitting
Range 50 @ 100 miles receiving
range larger
wave length generally
1.312 ft occasion on longer
wave length - latest subs
have much improved wireless

French say
from January 1 to Aug 1 1917

French boats successful
against Subs 106 Encounters
of which 34 Cases it was due to
manoeuvering to avoid torpedoes
& 62 Cases to use guns
Chiefly in reply to Subs
in 13 Cases however its warship
sub that started the fight
7 occasions Cargo boat
Chased Sub -
3 Cases Escaped by beaching boat

Oct 1/17

Another Convoy 7 Knots.

Another Convoy North Ireland
had no war ships of any
kind -

French Experts with propaganda
for firing at Subs -
7000 meters water Column could
not be seen for spotting
but when instantaneous fuzes used
OK & for further trials

Altitude of Hydroplanes
700 meters outline Vague
Should be less - say
500 meters

Big shells fired into Dunkirk from 17" gun do surprising little damage as the cone straight down ploughing thru the street but expending their energy in line of flight instead of laterally

Oct 15/17

English Sound Ranging finds

Have 6 positions with microfons 1500 yds apart, each total 7500 yds Base is placed 2000 yds from front line

Signals received from phones on a special type recording galvanometer capable of measuring 1/1000 of a second The time of flight to each the microfone is affected by report of the gun

In front of Messines at an advance is a man with key the moment he hears German gun he closes key, the waves then reaches microfone (although he gets a heavy bangs before)

time intervals read from record & geometrical deduction on map board

Position of gun & first of shell are found as well as this time of flight can be calculated & so the calibre of gun can in most cases be determined

Accuracy depends on weather & other sources of error, under good conditions error rarely exceeds 50 yds ~~the~~ can't work when wind of any strength is blowing

as report never reaches station
being deflected upwards by wind
Also interfered with when
large amount firing take place
& bombardment makes it
impossible

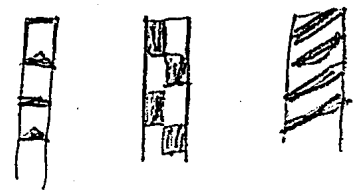
Microfone responds to guns
However faint as long as audible
is absolutely unaffected by other
noises such as speech & even
unaffected by suffering machine
10 yards

40 Miles wire used to connect
all phones & they are very
liable to be interrupted

The whole front in France
have the Second Rampart

This book shows Tables
of actual Experiments
Can be Copied

British & German Renscape
Camouflaged all kinds ways by
Paint, at Capt. Tadd.



Colors bright & dark Grey
some use light green — metallic
paint which is very satisfactory

British tow a fish or hydrophone
from destroyer, Use heavy
armored Cable 1 1/4" dia
a heavy weight of stream line
form called a pilot fish
which tows 200 ft astern
& 45 ft deep
The "fish" proper is 8 @ 9 ft long
& tows about 45 ft astern
of the pilot fish

the last 40 ft of wire has
a steel core & heavy insulation
of rubber outside of Electric
wires which surround the
core
Since the Hydrophones are of
a directional type the necessary
for them to rotate.
This is done by having 20 or
more wires running down towing
Cable into fish & connecting
to a local light device for
rotating the hydrophone in
Azimuth

Fish part 8@9 ft long 17½"
dia Cigar shaped
Each end air chamber
Fish filled with
water
says smaller fish ng

Fish has 4 vanes on Tail
says no water noises at
17 knots - filled with water
fish weighed 800 lbs & had only
a few lbs buoyancy
use 2 phones right angles
outside of ~~the~~ fish fastened
thereto with strips of 9
underwater d =
They had amplifiers & used them
when thought necessary
Use grain Carbon Micros
as it speaks of packing
have device to hit phone to
unpack
Eventually this is for
Depth Charge work
Elec Engineer talk showed he knew
nothing about diaphragms
Etc

12 Subs a month I gather
from these reports to the
Limit of German construction

Friendship
Slow speed when
submerged - Limited periscopes
~~Vem~~ horizon glass over Subs
in very precarious Condition
in efforts to locate, sight, and Crack
Subs of Enemy

Jutland battle, no German ships
Ever Explode magazine they
have Cordite fuse but no
Explosion - Yet British have
lots magazine Explosions
what have Germans got
S
14 German ships sunk by gunfire none

blown up
9 British sunk officials 6
blew up

British use my Smoke from
destroyers on disengaged
side to make it hard for enemy
to see, Reporter says something
in it, suggests it be rapidly
Controlled by signal

Sept 1 1917

"B" Class submarine is engaged
in testing Edison battery
individual group Vault Meter reading
are taken from groups of 5 cell
British officers are keenly
interested in Edison Bat

They have read the report of Board at NY Navy yard on Edison + Lead battery & in general are inclined to think Edison battery is an acceptable one for submarines.
The Claim they are not much impressed with the Hydrogen difficulty & that the Ventilation systems on board their boats, are entirely capable of coping for this factor
Then boats "B" & "E" ~~[illegible]~~ & subsequent classes do not have to float on the line in rough weather

Nov 1/1917

French say for seeing subs at a distance it is essential a lookout should be aloft - provided with powerful optical instruments
In order to pick up periscopes of subs ready to attack a deck lookout is necessary
Lookout should see a section of horizon from ahead to beam on each side, 137° on each side of ship. Must be particularly active in this section as it is most favorable for torpedo firing
(10) Either between 80° or 90° is most favorable firing distance 300 to 1000 meters

Says Zig Zag is only good if great deviations are made.
The above due to Experts

German Dub-
Discharg of Cadium

265 amp	20 hour	5300 amp	1.8V
480	10	4800	1.8
836	5	4180	1.75
1230	3	3690	1.75
1630	2	3260	1.70
2400	1	2400	1.65

Chg 200 amp
106 amp
Dead at 210 RPM

200 amp
63 "
" 120 "

Slowest possible speed of Motor
150 RPM Highest 350 @ 360
full speed 310
3/4 speed 280
1/2 speed 240
Slow speed 150
Current at 350 @ 360
2500 to 3000 amp
Battery Cap 10500 @ 11000 AH.
on 36 h discharge —

British Experiments
Depth Charge are now made only to break battery jars as this is the Easiest & most Vulnerable point as other points are not fatal although injured.

An officer in Mediterranean Explained frequency of torpedo hits & thanks its employed

Sub following a route parallel to ship attacked but on opposite tack then to turn out from this course at angles than 45 deg & launch torpedo from bow stern tube.

at the moment ship is passing

This maneuver is in fact much easier to execute when target forms part of a group navigating in line or about in line of bearing than when it would be necessary to attack with bow tube –

French have worked out our Zig Zag & reach same conclusion 12 knots no good.

English appear good gun on Cargo boats Gray cant work in stormy weather –

German Gunners afraid when starting out only get Heul instructions as to region to operate & these are not alterable – Mine laying Subs get definite instructions as to region to work

Mines always planted at night –

Worst they fear is Dirigibles Travelers next Seaplane & dirigible least feared anyway but bombs too weak to produce troublesome damage

Subs make little use of Radio for fear being picked up by radiometric stations

Aeroplanes & Dirigibles Can hear at great distances One heard 5 or 6 miles off

Attack on Cargo boats is most likely in Early Morning particularly in Early dawn

Convoys should have dirigibles they are invaluable

Nov 1 1917

Another Case Sub Kept her periscope between the Moon & Cargo boat.

A ship that got to Port after torpedoing had a hole 18 X 30 ft

14 Knot boat saw Sub - placed herself 6 ft Sub & Run & Escaped -

One Yanks Sub painted grey along water line - above painted in black & white squares

Norwegians say in April 1917
30 German subs trying to
pass via Baltic to North sea
got caught in ice & losing
one persisted as could rise
they were passing Narrows
submerged & pushed under
ice,

Some German subs carry a
small fog horn as a decoy
in fogs -

Days from trials carried out
by Patrol boats. Trained men
can hear by phone a sub
900 meters when sub
proceeds bow on at 2200 meters
when proceeding stern

a precision varying from
5° to 10° according to
distance can be counted on
Sun interferes as slightly heats
different layers of water
Choppy sea interferes seriously
Trawlers passing close by
interfered absolutely with
observation of the bearings
of the sub; without being able
to estimate the influence
it nevertheless was observed
that the revolution of engines
could be heard simultaneously
with the less distinct noise
of the propellers of the submarine

Nov 15 1917

Monitors at Lubeque

25000 yds shots from enemy gave surprisingly small splash on account of striking end on —
Sounds of Lubeque guns could not be heard,
shots gave little noise when striking water, projectiles go off when under water
probably on striking bottom
at any rate go off so deep
no evidence of explosion
visible from aloft. but thereon
deck distinctly has concussion
of projectile going off under
water,
Enemy do excellent shooting
Usually they use sound
triangulation, which common

onshore but new for ships off
shore if this is case smoke
screen serves no useful purpose
says accuracy of determining position
by sound method is astounding

They use oscillator galvanometer &
spot light & photo, several galv
on the sound measuring circuits
make straight line, when wave
from gun arrives this line
oscillates — another
device is recording on
smoked paper which is
much quicker

They use record of enemy gun in
conjunction with aeroplane bombs
can be done under water

British dont believe in
air wireless ship masts
Even their men meets they
are trying to break up in
sections of camouflaging

The wave length which Hydrophones detect under water is 18 ft

If Hydrophones are very near air buoyancy tanks in Fish

Question of 1/4 wave length of it they will have a good deal of sound Cut out

They propose to increase length of Fish to 12 ft – they are trying to get it down to 3 or 4 ft

They propose blocks of Paraffine instead of air for buoyancy –

The microphones being Embedded in the paraffine in this type they do not attempt to rotate the microfone but use 2 sets, one on each side: instead of Paraffine they may use a jelly like substance still Experimenting

Germans project electrical device into our lines & learn our future movements. We have been notified for some time how they do it – (Tap. throw in wires + hear by induction)

Periscopes Subs

Periscopes range finder.
Telemetric scale used with high power magnification — one usability used

large number of boats have periscopes fitted outside with Combined deflection table & telemeter scale —

Use Forbes log fitted with speed indicator

Wire sounding app used glass tubes, but accurate results can be obtained by amount of wire run out so its unnecessary use tubes on wire sounding

~~Aeroplane bombs due to wind etc 12000 ft. 80 ft out~~

Porpoise seems to follow submarine — 2 cases so far —

Allies use Carrier pigeons on their subs so not to reveal position by using radio —

English have a natural Hydrophones.

Navy only interested in Hydrofoils for boats for using Depth Bombs

So far no specific noise different from other boats comes from a sub principal frequency from subs 700 to 1000 cycles many other noises in water all about this frequency
what a few of them made by ship carrying the phone, hence own boats sounds must be eliminated.
At present must stop ship to use them. whereas whale about to get sub is to keep going
They say no trouble for repp to hear sub, but not when running this not been accomplished

Sub. sound different than Reg ships, subs slower there being no upper Rankills
They use Audions but trouble is Audions amplify the all sounds

Say its better to diminish sound rather than amplify this is result of Experience

Tried to break up slow sub waves by breakwater No

Trained Ear so far best picking out of Speed Made of the sound the Specific Sub seen for this have a detail with 120 men

Band men best blind men not a success

They low phone hammer not go too long for their hand to maneuver to drop depth only — Too close to boat phone on each side — to get direction

Use 5" dia diaphragm thickness at center 1/32 1/8 at its circumference

Have a heating Current in
microfoam to stop moisture
depositing on Carbon
granules

Can pick up Sub 7 @ 8 miles
(old type fish)
away. boat stopped -
Entirely free water noises
partition between phones not
much -

Proposed system hunting
4 trawlers in line 7 miles
apart Discharge 6 or 7 miles
in front or rear of trawlers
Armed gun, torpedoes, & explosive
paravanes, When sub
located & they think they

are on top of it trawlers drop
one depth Chg from stern
throws 2, (one on each side of boat)
similar depth chgs from her
Depth Charge Throwers
which send them 40 yards from
side of ships ~~depth~~ Two depth
Charges then dropped from stern
80 yards apart
They makes a circular
area 350 yards very
unhealthy
The Torpedo boat attacks if
it has a chance
Have Tapers to stop granules
of microfoam pkg

All searchlights went out By at Battle Jutland, glasses smashed, mirrors broken & arcs went out

Arc lights used to see where shots fall rather than objects

Germans say now they can torpedo ships from seaplanes carrying torpedoes, claim to dread a torpedo from subs.
also dirigible torpedoes controlled from shore, have them at Zeebrugge. One was hit by English Monitor

Americans use a bomb to throw a wire to intercept telephone messages

British have 80 ft wireless controlled motor boat 25 mile radius.

Are experimenting on a sound from sub device to set off depth bombs
Sound detonated mines, goes slows actually tried it when came near mines it exploded them. High speed boats don't.

German uses pendulum, Fire control is automatic on every big gun mounted on insulated, which forms the gun when in correct position,
Pendulum uses 2 Tiny Communicating Cylinders Contain oil. (Castor oil)
Whenever rolls pendulum gives exact vertical line
Consequentially horizontal a base is thus obtained by which gun can be given desired Elevation
Range got by Barometer

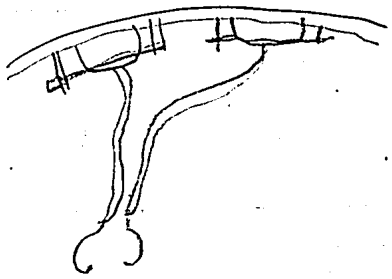
As long as the angle of Elevation is not correct an Electrical Connection between Instrument & gun makes it impossible to fire gun
gives 75 @ 80% hits at 14000 @ 18000 meters

German Torpedos
163 Kilo Tetrogh-
dia head 496 mm
Capacity air flask 520 Litres
Thickness 12 mm
Motherhood 4 cylinder

German subs have two small Diesels for charging accumulators - information not certain -

French have a phone connected to ship plotter at Base & listening tubes, heavy weight pendulum also a factor -
Hear while running
Det submerged 1000 @ 1500 meters
Surface patrol boats 2000 @ 3000
Detaching Dept. 3000 @ 4000
meters must be trained men to pick out from great mass of sounds

no mines used just hull of boat,



Jany 1 1918

Another place where difficult sea boats between under the sun —

German use 2 gyroscopes as best for long runs
one torpedo struck mark at end 10½ miles

German in sects use Microfons in ballast tanks in water
2 in bow 2 amidships 2 stern
all in same trunk
use condenser for damping sounds
They seemed to be tuned all to different

Current in Microfon 50 milliamp
Noisy machinery not used when boat running as could hear (1e) auxiliaries & Everybody must be dead quiet throughout boat Limit of speed of boat running Warning could the boat, use adjustable
Res to weaken when sounds too loud

Says things that

interface are

1 = Sandbanks, shoals & strips of land lying b/t sender & Receiver

2 = Sea Currents Especially if they are dif temperature from surrounding water -

3 Heavy seas

all of which result sound becoming faint or causing it to fade

also

1 = External noises, sounds made by boat, or sounds due to boat running

2 = Reports in microform or wkg

Jany 1 1918

German Subs have no difficulty passing Dover at night

German Subs have listening booths -

Say German subs have listening apparatus detecting sounds 5 miles only works satisfactory 3 miles

When pursued by vessels fitted with hydrophones Subs steer Zig Zag stopping occasionally to listen

supposed to be able to dive to 330 ft - When passing mine field go 65 ft When attacking go 36 ft

Subs operating in North painted grey Deck & boat bottom black Mediterranean green

Torpedos for German subs

Dia 19.7" length 16 ft 4"
Range 1200 to 1600 Yards
2 propellers, no heating device
not fitted with gyro angling
gear can be set for 16 ft
Carries heavy chg
only used against Coast Guard
will be hereafter furnished to all sub
its Not popular as large amount
Water is spilled on firing &
helps betray position of sub

English Coast Torpedo
1 55 cm but had a dim
stern light placed to show
3 points on either side
Was Zig Zagging at 8 1/2 Knots
(22 to show more lights)

In British Convoys the inside
Vessels keep both their stern
running lights burning while
outside Vessels have only
their stern lights & that both
American & Brit Crafts Merchantmen
& escorts are guilty of Continuous
Signalling lately blinker much
offensive to Commanding according
to this American Ship Capt
think no signally should be
done in clear weather & only
if any in rough or cloudy

On one occasion his ship was
in Convoy with 32 ships
on one night before Convoy,
out of danger zone he & his
1st officer counted planes
distinguish 23 vessels
His own ship had no lights
Except his altered stern
light

English have Kite Balloon with observer. They are a success, ~~the~~ man also uses flares at night to discover submarines last 5 min ~~effective up to 5000 yards~~ The short flares or star shells from guns on boat Effective for 5000 yards say very valuable

Delay is so sudden that it is liable to detonate TNT in shells stored on ship if struck by torpedo + Explode Magazine — Russians put shells on wood in magazine to stop waste, as it travels more easily —

Acetylene welding has been entirely displaced by Electric arc welding with Rosedale iron Electrode sommended with Tube of asbestos etc & are equipped with slag material to keep weld under slag —
all kinds munitions welded this way + all other wear appliances, are now trying varieties to get rid riveting
1 man replacing 5 riveters boilers Cruisers etc

Hunter should know this full report in my report
Intelligence Officer report

latest is that fish torpedo towed behind failed and no more expts will be made

No extension use of shore station sub listening devices has been made

Best phone is Walzer app as it permits listening ship under way - Ranges of sub listening devices which are any good at all seem to be about three or two miles more or less depending on orientation of sub or condition of water as to temperature layers

So far as we have been able to find out no careful expts in which the speed of a sub varied or expts to determine fundamental characteristics of sub sounds have been carried out.

It seems that up to date they have nothing practical

Transcript

Centrifugal bomb thrower

bombs ignite on breaking

use $KClO_3$ & sesquisulphide of phosphorus

ignition made against a corrugated surface made of compressed coal just after leaving machine

This tip is only applied to bombs at last moment

one soldier at crank 1 at small wheel + one or 2 to supply bombs to the funnel

English Balloon Kits
has photo apparatus in
dome, pull up + down to
develope

also for Radio Aerials -
But most important is
for sighting warships by
observer in Balloon Kite

Latest reports show many
sunk at night all in Convoy
showing that Convoys
have lights + when a
sub is in path they are

sure to get 1 or 2, sure
Our gyrolight will have to
be used. -

some Convoys run close
to lighthouse beams +
Subs laying in wait
get them when passing
through beam -
2 Cases + perhaps there
are lots more not
reported

Knierim figs

• submarine - 3400 yards from ship

Ships gives 100% noise & each 10% at Cargo boat then phone would be

- 500 yards
- 1000
- 1500

	Boat 100	Sub 10
500 yds — "	1.96	7.6
1000 — "	.49	5.96
1500 —	.22	4.82

Supposing Sub + phone same distance + Cargo boat makes 100 parts of noise at the boat + Submarine 10 parts at the Submarine - then ~~det~~ with phone at Boat,

Boat 100

noise from sub at Cargo after [illegible]

At Key

From 1915 to date.

Torpedoed-unseen 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 III	33
" Wake seen no Sub 𝍸 𝍸 𝍸 𝍸	20
" afterwards Sub 𝍸 𝍸 I	11
Sub seen then torpedoed 𝍸 𝍸 I	
Sub not seen, then shot at 𝍸 III	8
Sunk at night 𝍸	
Saw wake, Turned not sunk 𝍸 I	6
Sighted Sub before sunk 𝍸 I	

1

83% no Sub seen —

Attacks - not all sunk

Sept

Atlantic 54 attacks
10 nights (5 beg moon)
5 twilight
1 dawn
35 daylight —

Northern 19 —
1 twilight
1 dawn
17 daylight

11% at night

Channel 30 — 8 nights (4 moon)
5 twilight
3 dawn
14 daylight

Med 21 — 11 nights 3 moon
1 dawn
9 daylight

Gibraltar 36 steam 4 nights (3 moon)
4 twilight
28 daylight —